

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2016/2017

TCP3151 – INTEGRATIVE PROGRAMMING AND TECHNOLOGIES

(All sections / Groups)

17 October 2016
2.30pm – 4.30pm
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 6 pages excluding the cover page.
2. Attempt all FIVE questions.
3. All questions carry equal marks and the distribution of the marks for each question is given.
4. Please write your answers in the Answer Booklet provided.

QUESTION 1 (10 MARKS)

- a) Define the term of compilation. Outline ONE difference between native compiler and cross compiler.

(3 marks)

- b) You are a programmer in a software company. Recently, you are assigned by your department head to design the XML document to store book data for a bookshop. You finished some of the XML design based on the requirement from the staff of the bookshop. Construct a logical view from the XML document below so that you can present it in front of your department head.

```
<?xml version="1.0" encoding="UTF-8"?>
<library>
  <book code="118">
    <title>Java Programming</title>
    <author>Siti Razak</author>
    <year>2014</year>
  </book>
  <book code="121">
    <title>Logic Programming</title>
    <author>Walter Peter</author>
    <author>John Tan</author>
    <year>2015</year>
  </book>
</library>
```

(4 marks)

- c) You are an instructor to teach the course of Java Native Interface (JNI). Summarise the steps for calling C code from Java program to provide a clear understanding of Java Native Interface (JNI) for your student.

(3 marks)

Continued...

QUESTION 2 (10 MARKS)

- a) You are helping your boss to setup a new company to manage the increasing worldwide operations. Your boss plan to use centralized system in the new company. You try to persuade your boss to install the distributed system in the new company. List FOUR advantages of using the distributed system that will help your boss to change his decision.
(4 marks)
- b) A well-formed XML document means the XML complies with the W3C specification for XML. Prepare THREE syntactic rules that must be followed by XML document to fulfill the condition of "well-formed".
(3 marks)
- c) Java Native Interface (JNI) enables native methods used to get and set Java fields. There are two types of Java field, instance field and static filed. Distinguish the differences between instance field and static field.
(3 marks)

Continued...

QUESTION 3 (10 MARKS)

- a) What is middleware? List TWO examples of middleware.

(3 marks)

- b) Document Type Definition (DTD) is used to define the legal building blocks of an XML document. Compute an external DTD that complies with the following XML document.

```
<?xml version="1.0"?>
<!DOCTYPE lego SYSTEM "http://www.lego.com.my/lego.dtd">
<lego>
  <code>31009</code>
  <description>Small Cottage</description>
  <category>Creator</category>
  <country>Malaysia</country>
  <country>Singapore</country>
  <quantity unit="20" />
</lego>
```

(4 marks)

- c) In JNI, Java file invokes the native function that does not have any implementation code. The native function is implemented in C file. In the C file, there are two arguments in the native function implementation, JNIEnv* and jobject. Explain the usage of these two arguments.

(3 marks)

Continued...

QUESTION 4 (10 MARKS)

- a) COM (Component Object Model) is a Microsoft specification that defines the interaction between components in the Windows environment. COM provides the services by performing the necessary steps to make the call. List THREE type of servers that used by COM to make a call.

(3 marks)

- b) In XPath, path expressions are used to navigate the XML document. Write the path expression based on the given conditions below to retrieve the textual or element information for the following XML document.

```
<?xml version="1.0"?>
<videos>
  <video code="1124" rate="7.9">
    <title>Me Before You</title>
    <director>Thea Sharrock</director>
    <length unit="minutes">120</length>
  </video>
  <video code="1046" rate="6.5">
    <title>Cinderella</title>
    <director>Kenneth Branagh</director>
    <length unit="minutes">112</length>
  </video>
</videos>
```

- i. To retrieve the director name of all video. (1 mark)
 - ii. To retrieve the video code. (1 mark)
 - iii. To retrieve title element with rate more than 7. (1 mark)
- c) You are a senior Java programmer in a company. Recently, your colleague faces a problem to access an integer array in Java program from C implementation file using JNI. Briefly provide TWO approaches to access the integer Java array to help your colleague. Also, you must give related function from each approach to guide your colleague.

(4 marks)

Continued...

QUESTION 5 (10 MARKS)

- a) You are a team leader that is responsible for designing the database. Currently, the team is instructed by IT Manager to design an online ticketing system using scripting language. List FOUR advantages of using scripting language to motivate your team member to take the challenge.

(4 marks)

- b) Extensible Stylesheet Language Transformations (XSLT) is a programming language that used to transform the XML documents into HTML documents or other XML documents. Use XSLT to retrieve the content of song name and singer from following XML document and displays it in a HTML output.

```
<?xml version="1.0"?>
<songs>
  <song code="1124">
    <title>Blank Space</title>
    <singer>Taylor swift</singer>
    <year>2014</year>
  </song>
  <song code="1046">
    <title>Something In The Way You Move</title>
    <singer>Ellie Goulding</singer>
    <year>2016</year>
  </song>
</songs>
```

The HTML output is shown below:

```
<html>
  <body>
    <p>Blank Space</p>
    <p>Taylor swift</p>
    <p>Something In The Way You Move</p>
    <p>Ellie Goulding</p>
  </body>
</html>
```

(3 marks)

- c) JNI program involves the interoperation between Java and C file. Java file (StaMethod.java) below consists of a native method (call()) and a static method (callback()). The C implementation file (CStaMethod.c) is used to implement the call method and indirectly invoke the callback method from Java file. Fill in the correct code in the missing portion of C implementation file to retrieve the static method id.

(3 marks)

Continued...

```
// StaMethod.java

class StaMethod{
    private native void call();
    private static void callback(){
        System.out.println("I am in Java");
    }
    public static void main (String args[]){
        StaMethod c = new StaMethod();
        c.call();
    }
    static {
        System.loadLibrary("CStaMethod");
    }
}
```

```
// CStaMethod.c

#include <jni.h>
#include <stdio.h>

JNIEXPORT void JNICALL Java_StaMethod_call(JNIEnv *env,
jobject obj){

    // write your code here

    if (mid == NULL) {
        return;
    }

    printf("I am in C\n");
    (*env) -> CallStaticVoidMethod(env, cls, mid);
}
```